

United States Department of Agriculture Natural Resources Conservation Service

Ecological Site Description

Site Type: Rangeland

Site Name: Limestone Breaks

Site ID: R067BY060CO

Major Land Resource Area: 67B – Central High Plains, Southern Part

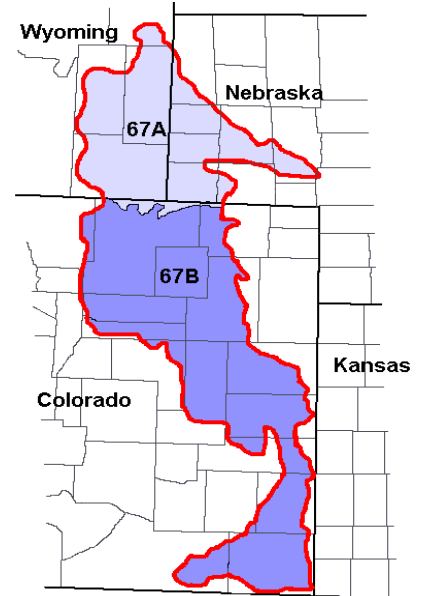
Physiographic Features

This site occurs on nearly level plains to very steep hills. Topography can be rough, broken with numerous ridges and knobs dissected by narrow, intermittent streams.

Landform: plains, hills

Aspect: N/A

	<u>Minimum</u>	<u>Maximum</u>
Elevation (feet):	3800	5600
Slope (percent):	0	60
Water Table Depth (inches):	60	60
Flooding:		
Frequency:	none	none
Duration:	none	none
Ponding:		
Depth (inches):	0	0
Frequency:	none	none
Duration:	none	none
Runoff Class:	low	medium



Climatic Features

The mean average annual precipitation varies from 12 to 16 inches per year depending on location and ranges from less than 8 inches to over 20 inches per year. Approximately 75 percent of the annual precipitation occurs during the growing season from mid-April to late-September. Snowfall can vary greatly from year to year but averages 35 to 45 inches per year. Winds are estimated to average about 9 miles per hour annually, ranging from 10 miles per hour during the spring to 9 miles per hour during late summer. Daytime winds are generally stronger than nighttime and occasional strong storms may bring periods of high winds with gusts to more than 90 miles per hour.

The average length of the growing season is 142 days, but varies from 129 to 154 days. The average date of first frost in the fall is September 28, and the last frost in the spring is about May 9. July is the hottest month and December and January are the coldest. It is not uncommon for the temperature to exceed 100 degrees F during the summer. Summer humidity is low and evaporation is high. The winters are characterized with frequent northerly winds, producing severe cold with temperatures dropping to -35 degrees F or lower.

Site Type: Rangeland
MLRA: 67B – Central High Plains, Southern Part

Limestone Breaks
R067BY060CO

Growth of native cool season plants begins about March 15 and continues to about June 15. Native warm season plants begin growth about May 15 and continue to about August 15. Regrowth of cool season plants occurs in September and October of most years, depending on moisture.

	<u>Minimum</u>	<u>Maximum</u>
Frost-free period (days):	129	154
Freeze-free period (days):	151	178
Mean Annual Precipitation (inches):	12	16

Average Monthly Precipitation (inches) and Temperature (°F):

	Precip. Min.	Precip. Max	Temp. Min.	Temp. Max.
January	0.32	0.36	12.0	45.1
February	0.26	0.38	15.9	50.9
March	0.83	0.87	22.3	58.9
April	1.28	1.38	30.1	69.1
May	2.32	2.49	39.9	78.0
June	1.93	2.57	49.0	88.7
July	1.42	2.31	55.0	93.9
August	1.07	2.38	53.5	91.9
September	1.02	1.40	43.8	83.8
October	0.89	1.00	32.5	72.9
November	0.52	0.53	20.9	57.4
December	0.34	0.37	11.9	46.9

Climate Stations		Period	
Station ID	Location or Name	From	To
CO0945	Briggsdale	1948	2000
CO4076	Holly	1918	2000
CO9147	Windsor	1948	1990

For local climate stations that may be more representative, refer to <http://www.wcc.nrcs.usda.gov>.

Influencing Water Features

Wetland Description:	<u>System</u>	<u>Subsystem</u>	<u>Class</u>	<u>Sub-class</u>
None	None	None	None	None

Stream Type: None

Representative Soil Features

The soils of this site are shallow but range to deep, well drained, and moderately rapid to moderately permeable. These soils occur on hills and plains. Most soils have bedrock at depths of 6 to 20 inches. The available water capacity is typically very low. The soil surface layer is typically 3 to 10 inches thick.

Exposed areas of limestone and bare ground are inherent to this site. Where slopes are gentle, water flow paths should be broken, irregular in appearance or discontinuous with numerous debris dams or vegetative barriers and exhibit slight to no evidence of rills, wind scoured areas or pedestaled plants.

As slopes become steep and bare areas increase, expect to find evidence of water flow patterns and pedestaled plants. Sub-surface soil layers, where not affected by bedrock, are non-restrictive to water movement and root penetration.

Major soil series correlated to this ecological site include: Canyon, Curabith*, Penrose

Other soil series that have been correlated to this site include: none

* Curabith soil is deep and lacks contact with bedrock

Parent Material Kind: residuum

Parent Material Origin: limestone

Surface Texture: gravelly loam, loam, channery loam

Surface Texture Modifier: none, gravelly, channery

Subsurface Texture Group: loamy

Surface Fragments $\leq 3''$ (% Cover): 0-25

Surface Fragments $> 3''$ (%Cover): 0-15

Subsurface Fragments $\leq 3''$ (% Volume): 0-65

Subsurface Fragments $> 3''$ (% Volume): 0-35

	<u>Minimum</u>	<u>Maximum</u>
Drainage Class:	well	well
Permeability Class:	moderate	moderately rapid
Depth (inches):	6	20
Electrical Conductivity (mmhos/cm)*:	0	14
Sodium Absorption Ratio*:	0	0
Soil Reaction (1:1 Water)*:	7.4	9.0
Available Water Capacity (inches)*:	.75	3
Calcium Carbonate Equivalent (percent)*:	10	35

*These attributes represent 0-40 inches in depth or to the first restrictive layer.

Plant Communities

Ecological Dynamics of the Site:

Continuous grazing without allowing for adequate recovery opportunities between grazing events causes this site to deteriorate. Grasses such as little bluestem, sideoats grama, big bluestem, switchgrass, yellow Indiangrass, prairie sandreed, western wheatgrass and needleandthread decrease in both frequency and production. Blue grama and threadleaf sedge will increase. Forbs and shrubs such as purple prairie clover, American vetch, winterfat and fourwing saltbush will decrease. Mid and tall grasses can eventually be removed from the plant community. Over the long-term, continuous use will result in large amounts of bare ground. Species such as red threeawn, sand dropseed, mat loco, sessile nailwort, small soapweed, broom snakeweed and annuals will increase or invade the site.

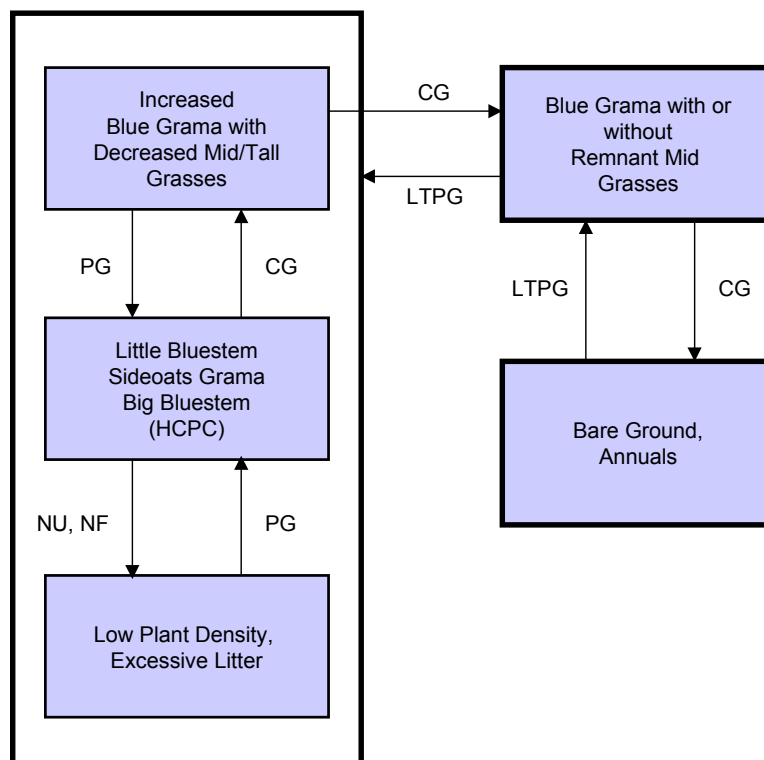
Tillage is not recommended on this site due to shallow soils and associated low production potential.

Wyoming feverfew (*Parthenium alpinum*) has been found on this site and is listed in the [Colorado Rare Plant Field Guide](#).

The historic climax plant community (description follows the plant community diagram) has been determined by study of rangeland relic areas, areas protected from excessive disturbance, seasonal use pastures, short duration/time controlled grazing and historical accounts.

The following diagram illustrates the common plant communities that can occur on the site and the transition pathways (arrows) among communities. Bold lines surrounding each plant community or communities represent ecological thresholds. The ecological processes are discussed in more detail in the plant community descriptions following the diagram.

Plant Communities and Transitional Pathways



CG - continuous grazing without adequate recovery opportunity, **HCPC** - Historic Climax Plant Community, **LTPG** - long-term prescribed grazing (>40 years), **NF, NU** - no fire, non-use, **PG** - prescribed grazing with adequate recovery opportunity

Plant Community Composition and Group Annual Production

COMMON/GROUP NAME	SCIENTIFIC NAME	SYMBOL	Little Bluestem, Sideoats Grama, Big Bluestem (HPCP)		
			Group	lbs./acre	% Comp
GRASSES & GRASS-LIKES			1	665 - 760	70 - 80
little bluestem	Schizachyrium scoparium	SCSC	1	143 - 190	15 - 20
sideoats grama	Bouteloua curtipendula	BOCU	1	143 - 190	15 - 20
big bluestem	Andropogon gerardii	ANGE	1	95 - 143	10 - 15
switchgrass	Panicum virgatum	PAVI2	1	48 - 95	5 - 10
blue grama	Bouteloua gracilis	BOGR2	1	48 - 67	5 - 7
Indiangrass	Sorghastrum nutans	SONU2	1	19 - 67	2 - 7
needleandthread	Hesperostipa comata ssp. comata	HECOC8	1	29 - 67	3 - 7
western wheatgrass	Pascopyrum smithii	PASM	1	29 - 67	3 - 7
green needlegrass	Nassella viridula	NAV14	1	10 - 48	1 - 5
hairy grama	Bouteloua hirsuta	BOH12	1	10 - 29	1 - 3
plains muhly	Muhlenbergia cuspidata	MUCU3	1	10 - 29	1 - 3
prairie sandreed	Calamovilfa longifolia	CALO	1	0 - 29	0 - 3
sand bluestem	Andropogon hallii	ANHA	1	0 - 19	0 - 2
bottlebrush squirreltail	Elymus elymoides ssp. elymoides	ELELE	1	0 - 10	0 - 1
buffalograss	Buchloe dactyloides	BUDA	1	0 - 10	0 - 1
Indian ricegrass	Achnatherum hymenoides	ACHY	1	0 - 10	0 - 1
prairie junegrass	Koeleria macrantha	KOMA	1	0 - 10	0 - 1
red threeawn	Aristida purpurea var. longiseta	ARPUL	1	0 - 10	0 - 1
ring muhly	Muhlenbergia torreyi	MUTO2	1	0 - 10	0 - 1
sand dropseed	Sporobolus cryptandrus	SPCR	1	0 - 10	0 - 1
sixweeks fescue	Vulpia octoflora	VUOC	1	0 - 10	0 - 1
thickspike wheatgrass	Elymus lanceolatus ssp. lanceolatus	ELLAL	1	0 - 10	0 - 1
tumblegrass	Schedonnardus paniculatus	SCPA	1	0 - 10	0 - 1
sun sedge	Carex inops ssp. heliophila	CAINH2	1	10 - 29	1 - 3
threadleaf sedge	Carex filifolia	CAFI	1	10 - 29	1 - 3
other native grasses		2GP	1	10 - 48	1 - 5
FORBS			2	95 - 143	10 - 15
dotted gayfeather	Liatris punctata	LIPU	2	10 - 19	1 - 2
purple prairie clover	Dalea purpurea	DAPU5	2	10 - 19	1 - 2
American vetch	Vicia americana	VIAM	2	0 - 10	0 - 1
Colorado greenthread	Thelesperma filifolium	THFI	2	0 - 10	0 - 1
cutleaf evening-primrose	Oenothera coronopifolia	OECO2	2	0 - 10	0 - 1
desert princesplume	Stanleya pinnata var. pinnata	STPIP	2	0 - 10	0 - 1
hairy goldaster	Heterotheca villosa	HEV14	2	0 - 10	0 - 1
heath aster	Symphyotrichum ericoides	SYER	2	0 - 10	0 - 1
Hood's phlox	Phlox hoodii	PHHO	2	0 - 10	0 - 1
ironplant goldenweed	Machaeranthera pinnatifida ssp. pinnatifida var. pinnatifida	MAPI4	2	0 - 10	0 - 1
James' cryptantha	Cryptantha cinerea var. jamesii	CRCU	2	0 - 10	0 - 1
Lambert crazyweed	Oxytropis lambertii	OXLA3	2	0 - 10	0 - 1
Louisiana sagewort	Artemisia ludoviciana	ARLU	2	0 - 10	0 - 1
mat loco	Astragalus kentrophyta	ASKE	2	0 - 10	0 - 1
narrowleaf penstemon	Penstemon angustifolius	PEAN4	2	0 - 10	0 - 1
upright prairie coneflower	Ratibida columnifera	RACO3	2	0 - 10	0 - 1
rush skeletonplant	Lygodesmia juncea	LYJU	2	0 - 10	0 - 1
scarlet globemallow	Sphaeralcea coccinea	SPCO	2	0 - 10	0 - 1
sessile nailwort	Paronychia sessiliflora	PASE	2	0 - 10	0 - 1
silky crazyweed	Oxytropis sericea	OXSE	2	0 - 10	0 - 1
slimflower scurfpea	Psoralidium tenuiflorum	PSTE5	2	0 - 10	0 - 1
stemless hymenoxys	Tetranneuris acaulis	TEAC	2	0 - 10	0 - 1
sulfur-flower buckwheat	Eriogonum umbellatum	ERUM	2	0 - 10	0 - 1
western ragweed	Ambrosia psilostachya	AMPS	2	0 - 10	0 - 1
woolly Indianwheat	Plantago patagonica	PLPA2	2	0 - 10	0 - 1
woolly locoweed	Astragalus mollissimus	ASMO7	2	0 - 10	0 - 1
wormwood	Artemisia dracunculus	ARDR4	2	0 - 10	0 - 1
Wyoming feverfew	Parthenium alpinum	PAAL6	2	0 - 10	0 - 1
other perennial forbs		2FP	2		
SHRUBS			3	95 - 143	10 - 15
winterfat	Krascheninnikovia lanata	KRLA2	3	10 - 48	1 - 5
fourwing saltbush	Atriplex canescens	ATCA2	3	10 - 29	1 - 3
golden currant	Ribes aureum	RIAU	3	0 - 19	0 - 2
skunkbush sumac	Rhus trilobata	RHTR	3	0 - 19	0 - 2
wax currant	Ribes cereum	RICE	3	0 - 19	0 - 2
broom snakeweed	Gutierrezia sarothrae	GUSA2	3	0 - 10	0 - 1
fringed sagebrush	Artemisia frigida	ARFR4	3	0 - 10	0 - 1
plains pricklypear	Opuntia polyacantha	OPPO	3	0 - 10	0 - 1
rubber rabbitbrush	Ericameria nauseosa ssp. nauseosa var. nauseosa	ERNAN5	3	0 - 10	0 - 1
small soapweed	Yucca glauca	YUGL	3	0 - 10	0 - 1
other native shrubs		2SHRUB	3	10 - 29	1 - 3
Annual Production lbs./acre			LOW RV* HIGH		
GRASSES & GRASS-LIKES			370 - 710 - 1160		
FORBS			90 - 120 - 145		
SHRUBS			90 - 120 - 145		
TREES					
TOTAL			550 - 950 - 1450		

This list of plants and their relative proportions are based on near normal years. Fluctuations in species composition and relative production may change from year to year dependent upon precipitation or other climatic factors. * RV - Representative Value.

Plant Community Narratives

Following are the narratives for each of the described plant communities. These plant communities may not represent every possibility, but they probably are the most prevalent and repeatable plant communities. The plant composition table shown above has been developed from the best available knowledge at the time of this revision. As more data is collected, some of these plant communities may be revised or removed, and new ones may be added. None of these plant communities should necessarily be thought of as “Desired Plant Communities”. According to the USDA NRCS National Range and Pasture Handbook, Desired Plant Communities will be determined by the decision makers and will meet minimum quality criteria established by the NRCS. The main purpose for including any description of a plant community here is to capture the current knowledge and experience at the time of this revision.

Little Bluestem, Sideoats Grama, Big Bluestem Plant Community

This plant community is the interpretive plant community for this site and is considered to be the Historic Climax Plant Community (HCPC). This community evolved with grazing by large herbivores and is suited to grazing by domestic livestock. Historically, fires likely occurred infrequently. This plant community can be found on areas that are grazed and where the grazed plants receive adequate periods of recovery during the growing season. The potential vegetation is about 70-80% grasses and grass-like, 10-15% forbs and 10-15% woody plants.

The principal grasses that dominate this community are little bluestem, sideoats grama and big bluestem. Secondary grasses are switchgrass, Indiangrass, blue grama, prairie sandreed, western wheatgrass and needleandthread. Threadleaf sedge and sun sedge are common. Dominant forbs include purple prairie clover, dotted gayfeather, mat loco, sessile nailwort and Hood’s phlox. Winterfat, fourwing saltbush, skunkbush sumac, wax currant and golden currant are key shrubs.

This is a sustainable plant community in terms of soil stability, watershed function and biological integrity. Litter is properly distributed where vegetative cover is continuous. Some litter movement may occur on steeper slopes. Decadence and natural plant mortality is very low. Community dynamics, nutrient cycle, water cycle and energy flow are functioning properly. This community is resistant to many disturbances except continuous grazing, tillage and/or development into urban or other uses. Areas having lost all vegetation, such as livestock and vehicle trails are subject to high erosion rates and extreme runoff.

Total annual production, during an average year, ranges from 550 to 1450 pounds of air-dry weight and will average 950 pounds.

The following is an estimated growth curve of this plant community expected during a normal year. Vegetative growth begins earlier in the southern reaches (Baca, Bent, Kiowa, Las Animas and Prowers counties) of MLRA-67B. Vegetative growth will typically be suppressed during the months of June through August in these counties due to higher evapotranspiration rates.

Growth curve number: CO6702

Growth curve name: Warm season dominant, cool season sub-dominant; MLRA-67B, upland fine textured soils.

JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP	OCT	NOV	DEC
0	0	0	2	15	45	20	15	3	0	0	0

(monthly percentages of total annual growth)

Transitions or pathways leading to other plant communities are as follows:

- Continuous grazing without adequate recovery periods between grazing events will shift this plant community toward the *Increased Blue Grama with Decreased Mid and Tall Grass Plant Community*.

- Non-use (rest) and no fire will move this plant community to the *Low Plant Density, Excessive Litter Plant Community*. Lack of use (rest) causes the plants to become less vigorous, crowns of plants begin to die, and plant canopy begins to open up with more bare ground apparent.
- Prescribed grazing that allows for adequate recovery opportunity following each grazing event and proper stocking will maintain the *Little Bluestem, Sideoats Grama, Big Bluestem Plant Community (HCPC)*.

Increased Blue Grama with Decreased Mid and Tall Grass Plant Community

This plant community developed with continuous grazing without adequate recovery periods during the growing season. The dominant grass is blue grama. Little bluestem and sideoats grama are still present as secondary grasses in the community. Big bluestem, Indiangrass, switchgrass, prairie sandreed, needleandthread and western wheatgrass have been significantly reduced. Forbs and shrubs that have increased are mat loco, sessile nailwort, Hood's phlox, hairy goldaster, western ragweed, slimflower scurfpea, small soapweed and fringed sagebrush. Purple prairie clover, winterfat, fourwing saltbush, currants and skunkbush sumac have been significantly reduced.

Plant frequency, production and litter levels are lower compared to the HCPC. Soil erosion may be a concern at this point especially on high travel or impact areas. Some flow paths may be connected and minor rilling evident. Water cycle and nutrient cycle are beginning to be affected by the reduction of key warm/cool season species, forbs and shrubs. Desertification is becoming apparent.

Total annual production can vary from 250 to 800 pounds of air-dry vegetation per acre and will average 500 pounds during an average year.

The following is an estimated growth curve of this plant community expected during a normal year. Vegetative growth begins earlier in the southern reaches (Baca, Bent, Kiowa, Las Animas and Prowers counties) of MLRA-67B. Vegetative growth will typically be suppressed during the months of June through August in these counties due to higher evapotranspiration rates.

Growth curve number: CO6702

Growth curve name: Warm season dominant, cool season sub-dominant; MLRA-67B, upland fine textured soils.

JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP	OCT	NOV	DEC
0	0	0	2	15	45	20	15	3	0	0	0

(monthly percentages of total annual growth)

Transitions or pathways leading to other plant communities are as follows:

- Continuous grazing without adequate recovery opportunities between grazing events will shift this plant community across an ecological threshold toward the *Blue Grama with or without Remnant Mid Grasses Plant Community*.
- Prescribed grazing that allows for adequate recovery periods between grazing events and proper stocking will move this plant community toward the *Little Bluestem, Sideoats Grama, Big Bluestem Plant Community (HCPC)*.

Low Plant Density, Excessive Litter Plant Community

This plant community developed under many years of non-use (rest) and lack of fire. Plant species resemble the HCPC however, species frequency and production will be reduced. Eventually, litter levels can become high enough to cause stagnation and mortality of various species such as little bluestem, sideoats grama, big bluestem, Indiangrass, switchgrass and blue grama. Bunchgrasses typically develop dead centers and rhizomatous grasses form small communities because of a lack of stimulation by grazing animals.

Initially, high surface litter levels will minimize erosion. Advanced stages of non-use (rest) or lack of fire can result in lower vigor plants, causing an increase in bare areas. These areas can be susceptible to water erosion, especially on steeper slopes.

Total annual production can vary from 250 to 950 pounds of air-dry vegetation per acre.

The following is an estimated growth curve of this plant community expected during a normal year. Vegetative growth begins earlier in the southern reaches (Baca, Bent, Kiowa, Las Animas and Prowers counties) of MLRA-67B. Vegetative growth will typically be suppressed during the months of June through August in these counties due to higher evapotranspiration rates.

Growth curve number: CO6706

Growth curve name: Warm season dominant, cool season sub-dominant, excess litter; MLRA-67B; upland fine textured soils.

JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP	OCT	NOV	DEC
0	0	2	8	15	35	18	13	7	2	0	0

(monthly percentages of total annual growth)

Transitions or pathways leading to other plant communities are as follows:

- Prescribed grazing that allows for adequate recovery opportunity between grazing events or prescribed burning followed by prescribed grazing will shift this plant community toward the *Little Bluestem, Sideoats Grama, Big Bluestem Plant Community (HCPC)*.

Blue Grama with or without Remnant Mid Grasses Plant Community

This plant community developed with continuous grazing without adequate recovery periods between grazing events. The dominant grass is blue grama. Hairy grama, red threeawn and threadleaf sedge has increased. Tall grasses, palatable forbs and shrubs have been removed. Little bluestem and sideoats grama may exist in remnant amounts on steeper slopes. Forbs and shrubs that continue to increase are mat loco, sessile nailwort, Hood's phlox, fringed sagebrush and small soapweed.

A major shift in species composition and plant functional groups has taken place. Nutrient and water cycles have been negatively affected due to the loss of nitrogen fixing forbs and deeper-rooted plants. Soil erosion is a concern. Rills and pedestaled plants with exposed roots are apparent. Desertification is advanced.

Production ranges from 150 to 400 pounds of air-dry vegetation per acre per year and will average approximately 250 pounds.

The following is an estimated growth curve of this plant community expected during a normal year. Vegetative growth begins earlier in the southern reaches (Baca, Bent, Kiowa, Las Animas and Prowers counties) of MLRA-67B. Vegetative growth will typically be suppressed during the months of June through August in these counties due to higher evapotranspiration rates.

Growth curve number: CO6707

Growth curve name: Warm season dominant; MLRA-67B; upland fine textured soils.

JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP	OCT	NOV	DEC
0	0	0	3	20	45	20	10	2	0	0	0

(monthly percentages of total annual growth)

Transitions or pathways leading to other plant communities are as follows:

- Continuous grazing without adequate recovery periods between grazing events will shift this plant community across an ecological threshold toward the *Bare Ground, Annuals Plant Community*.

- Long term prescribed grazing that allows for adequate recovery opportunities between grazing events and proper stocking will move this plant community toward the *Increased Blue Grama with Decreased Mid and Tall Grass Plant Community* and will eventually return to the *HCPC* or associated successional plant communities assuming an adequate seed/vegetative source is/are available. This transition may take upwards of 40 years or more to achieve.

Bare Ground, Annuals Plant Community

Continuous grazing without adequate recovery opportunities following each grazing event forms this plant community. Bare ground has significantly increased. Remnant amounts of blue and hairy grama may exist in localized areas. Small soapweed, broom snakeweed and pricklypear cactus may remain. Annuals invading or increasing are cheatgrass, kochia and Russian thistle.

Litter levels have been reduced substantially. Soil erosion hazard has increased due to the increase of bare ground and may be severe on steeper slopes. Biological integrity, watershed function and soil stability are all impaired. Desertification is obvious.

Total annual production can vary from 50 to 200 pounds of air-dry vegetation per acre.

The following is an estimated growth curve of this plant community expected during a normal year. Vegetative growth begins earlier in the southern reaches (Baca, Bent, Kiowa, Las Animas and Prowers counties) of MLRA-67B. Vegetative growth will typically be suppressed during the months of June through August in these counties due to higher evapotranspiration rates.

Growth curve number: CO6707

Growth curve name: Warm season dominant; MLRA-67B; upland fine textured soils.

JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP	OCT	NOV	DEC
0	0	0	3	20	45	20	10	2	0	0	0

(monthly percentages of total annual growth)

Transitions or pathways leading to other plant communities are as follows:

- Long term prescribed grazing that allows for adequate recovery periods between grazing events and proper stocking will move this plant community toward the *Blue Grama with or without Remnant Mid Grasses Plant Community* assuming an adequate seed/vegetative source is present. This transition may take 40 years or more to achieve.

Ecological Site Interpretations

Animal Community – Wildlife Interpretations

Little Bluestem, Sideoats Grama, Big Bluestem Plant Community

The structural diversity in the plant community found on the HCPC is attractive to a number of wildlife species. Common bird species expected on this community include Cassin's and Brewer's sparrow, chestnut collared longspur, lark bunting, western meadowlark, and ferruginous and Swainson's hawks. The combination of mid-tall grasses and shrubs provides habitat for greater and lesser prairie chicken in the eastern parts of this site. Scaled quail may also use this site.

White-tailed and black-tailed jackrabbit, badger, pronghorn, coyote, swift fox, plains pocket gopher, long-tailed weasel, and several species of mice are mammals that commonly use this plant community. Reptiles using this community include western rattlesnake, bullsnake, plains garter snake (if water is in home range), western hognose snake, racer, western box turtle, and six-lined racerunner.

Increased Blue Grama with Decreased Mid and Tall Grass Plant Community

All HCPC species are expected in this plant community, however, the loss of some of the vegetative structural diversity in this plant community make it less attractive to the HCPC species.

Low Plant Density, Excessive Litter Plant Community

Although the HCPC species are still expected here, the degraded habitat conditions will limit wildlife carrying capacity.

Blue Grama with or without Remnant Mid Grasses Plant Community and Bare Ground, Annuals Plant Community

The loss of shrubs and taller grasses in these plant communities results in a shift of bird species away from the HCPC birds. Lark bunting, chestnut-collared longspur, and western meadowlark use declines and Cassin's sparrow stop using the communities altogether. Habitat conditions improve for long-billed curlew, McCown's longspur, burrowing owl, mountain plover, killdeer, and horned lark. Ferruginous and Swainson's hawks are frequent users of these communities.

Most mammals will be the same as in the HCPC, however jackrabbit, black-tailed prairie dog, desert cottontail, and thirteen-lined ground squirrel use will increase because of the changing plant community. Reptiles using these communities are the same as in the HCPC.

Other Potential Species

The plains spadefoot is the only common species of frog or toad inhabiting grasslands in Eastern Colorado. This species requires water for breeding. Tiger salamanders may be found on grassland sites, but require a water body for breeding. Either of these species may be found in any plant community if seasonal water requirements are met. Mule and white-tailed deer may use this ecological site, however the shrub cover is too low to provide escape or hiding cover. On ecological site locations near riparian areas, deer will use the vegetation for feeding. Big brown bats will use any plant community on this ecological site if a building site is in the area. The gray wolf, black-footed ferret, and wild bison used this ecological site in historic times. The wolf and ferret are thought to be extirpated from Eastern Colorado. Bison are currently found only as domestic livestock.

Animal Preferences (Quarterly – 1,2,3,4[†])

Common Name	Cattle	Sheep	Horses	Deer	Antelope	Bison	Elk
Grasses and Grass-like							
big bluestem	U D P D	U D U U	U D P D	U D U U	U D U U	U D P D	U D P D
blue grama	D P P D	D P P D	D P P D	D P P D	D P P D	D P P D	D P P D
buffalograss	D D P D	D D P D	D D P D	D D P D	D D P D	D D P D	D D P D
green needlegrass	U P D D	U P D D	U P D D	U P D D	U P D D	U P D D	U P D D
hairy grama	U D P U	D P P D	U D P U	D P P D	D P P D	U D P U	U D P U
Indian ricegrass	D P D D	D P D D	D P D D	D P D D	D P D D	D P D D	D P D D
Indiangrass	U D P D	U D U U	U D P D	U D U U	U D U U	U D P D	U D P D
little bluestem	U D P U	N D D N	U D P U	N D D N	N D D N	U D P U	U D P U
needleandthread	U P D D	N D D N	U P D D	N D D N	N D D N	U P D D	U P D D
plains muhly	U U D U	U U D U	U U D U	U U D U	U U D U	U U D U	U U D U
prairie junegrass	U D U D	N D N U	U D U D	N D N U	N D N U	U D U D	U D U D
prairie sandreed	U D D U	U D U U	U D D U	U D U U	U D U U	U D D U	U D D U
ring muhly	N N N N	U U U U	N N N N	U U U U	U U U U	N N N N	N N N N
sand bluestem	U D P D	U D U U	U D P D	U D U U	U D U U	U D P D	U D P D
sideoats grama	U D P U	U D P U	U D P U	U D P U	U D P U	U D P U	U D P U
sixweeks fescue	N D N N	N D N N	N D N N	N D N N	N D N N	N D N N	N D N N
switchgrass	U D D U	U D U U	U D D U	U D U U	U D U U	U D D U	U D D U
tumblegrass	N N N N	N N N N	N N N N	N N N N	N N N N	N N N N	N N N N
western wheatgrass	U P D D	U P D D	U P D D	U P D D	U P D D	U P D D	U P D D
sun sedge	U P D D	U P D D	U P D D	U P D D	U P D D	U P D D	U P D D
threadleaf sedge	U D U D	U P N D	U D U D	U P N D	U P N D	U D U D	U D U D
Forbs							
American vetch	D P P D	D P P D	D P P D	D P P D	D P P D	D P P D	D P P D
Colorado green thread	U U U U	N N N N	U U U U	N N N N	N N N N	U U U U	U U U U
cutleaf evening-primrose	U U U U	N U U N	U U U U	N U U N	N U U N	U U U U	U U U U
desert princesplume	T T T T	T T T T	T T T T	T T T T	T T T T	T T T T	T T T T
dotted gayfeather	U U D U	U D P U	U U D U	U D P U	U D P U	U U D U	U U D U
hairy goldaster	U U D U	N N N N	U U D U	N N N N	N N N N	U U D U	U U D U
heath aster	U U D U	U U P U	U U D U	U U P U	U U P U	U U D U	U U D U
ironplant goldenweed	U D D U	U P P U	U D D U	U P P U	U P P U	U D D U	U D D U
Lambert crazyweed	T T T T	T T T T	T T T T	T T T T	T T T T	T T T T	T T T T
Louisiana sagewort	U U U U	U U D U	U U U U	U U D U	U U D U	U U U U	U U U U
narrowleaf penstemon	U D U U	U P P U	U D U U	U P P U	U P P U	U D U U	U D U U
purple prairie clover	U P P D	U P P U	U P P D	U P P U	U P P U	U P P D	U P P D
rush skeletonplant	U U U U	N N N N	U U U U	N N N N	N N N N	U U U U	U U U U
scarlet globemallow	U D D U	U P P U	U D D U	U P P U	U P P U	U D D U	U D D U
silky crazyweed	T T T T	T T T T	T T T T	T T T T	T T T T	T T T T	T T T T
slimflower scurfpea	N N N N	N U U N	N N N N	N U U N	N U U N	N N N N	N N N N
sulphur-flower buckwheat	U U D U	U U U U	U U D U	U U U U	U U U U	U U D U	U U D U
upright prairie coneflower	U U D U	U P P U	U U D U	U P P U	U P P U	U U D U	U U D U
western ragweed	U D U U	U D U U	U D U U	U D U U	U D U U	U D U U	U D U U
Shrubs							
broom snakeweed	N N N N	N N N N	N N N N	N N N N	N N N N	N N N N	N N N N
currant	D U U D	D U U D	D U U D	D U U D	D U U D	D U U D	D U U D
fourwing saltbush	P D D P	P D D P	P D D P	P D D P	P D D P	P D D P	P D D P
fringed sagebrush	U N N U	U D D U	U N N U	U D D U	U D D U	U N N U	U N N U
plains pricklypear	N N N N	N N N N	N N N N	N N N N	N N N N	N N N N	N N N N
rubber rabbitbrush	N N N D	D D D D	N N N D	D D D D	D D D D	N N N D	N N N D
skunkbush sumac	D U U D	D U U D	D U U D	D U U D	D U U D	D U U D	D U U D
small soapweed	D P N D	D P N D	D P N D	D P N D	D P N D	D P N D	D P N D
winterfat	P P P P	P P P P	P P P P	P P P P	P P P P	P P P P	P P P P

N = not used; **U** = undesirable; **D** = desirable; **P** = preferred; **T** = toxic

[†] Quarters: 1 – Jan., Feb., Mar.; 2 – Apr., May, Jun.; 3 – Jul., Aug., Sep.; 4 – Oct., Nov., Dec.

Animal Community – Grazing Interpretations

The following table lists suggested initial stocking rates for cattle under continuous grazing (year long grazing or growing season long grazing) under normal growing conditions however, *continuous grazing is not recommended*. These are conservative estimates that should be used only as guidelines in the initial stages of the conservation planning process. Often, the current plant composition does not entirely match any particular plant community (described in this ecological site description). Because of this, a field visit is recommended, in all cases, to document plant composition and production. More precise carrying capacity estimates should eventually be calculated using the following stocking rate information along with animal preference data, particularly when grazers other than cattle are involved. Under more intensive grazing management, improved harvest efficiencies can result in an increased carrying capacity.

Plant Community	Production (lbs./acre)	Stocking Rate (AUM/acre)
Little Bluestem Sideoats Grama, Big Bluestem (HCPC)	950	0.30
Increased Blue Grama w/Decreased Mid/Tall Grasses	500	0.13
Blue Grama with or without Remnant Mid Grasses	250	0.08
Low Plant Density, Excessive Litter	*	*
Annuals, Bare Ground	*	*

Grazing by domestic livestock is one of the major income-producing industries in the area. Rangelands in this area provide yearlong forage under prescribed grazing for cattle, sheep, horses and other herbivores. During the dormant period, livestock may need supplementation based on reliable forage analysis.

* Highly variable; stocking rate needs to be determined on site.

Hydrology Functions

Water is the principal factor limiting forage production on this site. This site is dominated by soils in hydrologic group B, with localized areas in hydrologic group A. Infiltration is moderate to high and runoff potential for this site is moderate depending on soil hydrologic group and ground cover. Areas where ground cover is less than 50% have the greatest potential to have reduced infiltration and higher runoff (refer to NRCS Section 4, National Engineering Handbook (NEH-4) for runoff quantities and hydrologic curves).

Recreational Uses

This site provides hunting, hiking, photography, bird watching and other opportunities. The wide varieties of plants that bloom from spring until fall have an esthetic value that appeals to visitors.

Wood Products

No appreciable wood products are present on the site.

Other Products

None noted.

Supporting Information

Associated Sites

- (R067BY002CO) – Loamy (formerly Loamy Plains)
- (R067BY008CO) – Loamy Slopes
- (R067BY042CO) – Clayey (formerly Clayey Plains)
- (R067BY063CO) – Gravel Breaks
- (R067BY056CO) – Sandstone Breaks
- (R067BY039CO) – Shallow Siltstone
- (R067BY009CO) – Siltstone Plains

Similar Sites

- (R067BY063CO) – Gravel Breaks
[gravelly soils]
- (R067BY056CO) – Sandstone Breaks
[sandier, less calcareous soils]

Inventory Data References

Information presented here has been derived from NRCS clipping data, numerous ocular estimates and other inventory data. Field observations from experienced range trained personnel were used extensively to develop this ecological site description. Specific data information is contained in individual landowner/user case files and other files located in county NRCS field offices.

Those involved in developing this site description include: Harvey Sprock, Rangeland Management Specialist, NRCS; Ben Berlinger, Rangeland Management Specialist, NRCS; James Borchert, Soil Scientist, NRCS; Terri Skadeland, Biologist, NRCS.

State Correlation

This site is unique to Colorado.

Field Offices

Akron, Brighton, Burlington, Byers, Cheyenne Wells, Eads, Flagler, Fort Collins, Fort Morgan, Greeley, Holly, Hugo, Kiowa, Lakewood (metro), Lamar, Longmont, Simla, Springfield, Sterling

Other References

High Plains Regional Climate Center, University of Nebraska, 830728 Chase Hall, Lincoln, NE 68583-0728. (<http://hpccsun.unl.edu>)

USDA, NRCS. National Water and Climate Center, 101 SW Main, Suite 1600, Portland, OR 97204-3224. (<http://wcc.nrcs.usda.gov>)

USDA, NRCS. National Range and Pasture Handbook, September 1997

USDA, NRCS. National Soil Information System, Information Technology Center, 2150 Centre Avenue, Building A, Fort Collins, CO 80526. (<http://nasis.nrcs.usda.gov>)

USDA, NRCS. 2004. The PLANTS Database, Version 3.1 (<http://plants.usda.gov>). National Plant Data Center, Baton Rouge, LA 70874-4490 USA.

Andrews, R. and R. Righter. 1992. Colorado Birds. Denver Museum Nat. Hist., Denver, CO. 442 pp.

Armstrong, D.M. 1972. Distribution of mammals in Colorado. Univ. Kansas Museum Nat. Hist. Monograph #3. 415 pp.

Colorado Breeding Bird Atlas. 1998. Hugh Kingery, Ed., Dist. CO Wildlife Heritage Found., P.O. Box 211512, Denver, CO, 80221. 636 pp.

Fitzgerald, J.P., C.A. Meaney, and D.M. Armstrong. 1994. Mammals of Colorado. Denver Museum Nat. Hist. Denver, CO. 467 pp.

Hammerson, G.A. 1986. Amphibians and reptiles in Colorado. CO Div. Wild. Publication Code DOW-M-I-3-86. 131 pp.

Rennicke, J. 1990. Colorado Wildlife. Falcon Press, Helena and Billings, MT and CO Div. Wildlife, Denver CO. 138 pp.

Site Description Approval

/s/

03/25/2004

State Range Management Specialist

Date